ALBRECHT®

User Manual

AE 497 W (25-30 W-Version)

10-Meter Amateur Radio Base Station

ALBRECHT®

Legal notes and general information

This amateur radio base station complies to the minimum requirements of the EU directives 2004/108/EG (EMC), full fills the harmonized EU standards EN 301 783-2 (commercial available amateur radio products , EN 301 489-1 und-15 (EMC) und EN 60950-1:2006 (safety and LVD -directive 73/23/EWG) nad is marked with the CE logo.

Following conditions apply:

In all European countries this transceiver is subject to national amateur radio regulations. It may be used only by persons, who have obtained a valid amateur radio licence.
Radio amateurs are only allowed to use this radio on assigned amateur radio frequencies within the 10 m band, even if this radio should be able to switch other adjacent frequencies. National regulations may exist for environmental RF protection and must be applied by the operator.
It is not allowed to use this radio for any other purpose except amateur radio.

If this radio shall be used in a configuration with other accessory items or amplifiers, the radio amateur is responsible to keep the radiations within the legal limits of his licence class, especially he has to follow the rules and standards of the above mentioned EU directive and technical standards, especially EN 301 783-2. It may be necessary to add separate harmonics filters when combining to amplifiers or SWR meters or antenna switching devices.

This radio is not declared to be used in cars during motion, because we cannot declare that there is no possible influence on the electronic engine management. Please respect the automotive directive requirements, which request that such devices are not allowed to be connected to the car network as long as the car engine is running. These restrictions are only valid for passenger cars and trucks and do not apply to parking recreation vehicles, boats or other environments with 12 V power supply.

ALAN ELECTRONICS GMBH

The text of the English manual corresponds to international versions and is not in all parts equal to the German language user manual.

SPECIFICATIONS

GENERAL

Frequency Range ……..28.000 to 29.699MHz
Frequency Control ……Phase Lock Loop (PLL) synthesizer
Frequency Stability…… ± 300HZ
Frequency Tolerance ……0.0003%
Emission Mode…… A3E(AM), F3E(FM), J3E(SSB)
Microphone ……Electret type 6 pin plug, with PTT, up/down and coiled cord
Input Voltage ……13.8V DC nominal, 15,9V max. 12.0V min
230V AC
Size (WDH)……300 x 240 x 85mm
Weight ……..3,4Kg
Antenna Connector…… SO-239 50 ohm unbalanced
Speaker……8 ohm, 3 watts

TRANSMITTER

Power Output ……AM max. 7-8W, FM 25W-30 W, SSB 25W-30W PEP
Spurious Emission ……..……-36 dBm or – 60 dBc
Current Drain No Modulation ……FM/AM less than 4 A
SSB ……..…without modulation less than 1.0A
Current Drain SSB with Modulation……SSB less than 4 A
Modulation Frequency Response
(1 KHz, 0dB Reference)……....Lower, at 450Hz, AM -6dB, SSB -6dB
Upper, at 2.5KHz, AM -6dB, SSB -6dB
Microphone Sensitivity ……..AM 2.mV for 60% mod
FM 1.8mV for 1.5 kHz deviation
Microphone Amplifier ……AM 50dB (between 89% and 80% modulation)
SSB 50dB (between 25 W PEP and 10W PEP)

RECEIVER

Max Sensitivity for 6dB S/N…… AM 0.5uV, FM/SSB 0.25uV
Sensitivity for 10dB S/N ……..AM 0.5uV, FM/SSB 0.25uV
Overload Audio Fidelity at 6dB Down ……450Hz ~ 2000 Hz
Adjacent Channel Selectivity ……..……FM/AM 60dB, SSB 70dB
Image Rejection (5.6MHz) ……Typically better than 90 dB
IF Rejection ……..70dB or better
Max Audio Output Power ……..AM/FM/SSB 2.5 watts
Squelch Range……..Adjustable from 0.5Uv to 1mV
Receiver Clarifier Range……..…±1.25KHz Variable
Dynamic Range…… 65dB (SSB)

Overview: Knobs and Keyboard functions

1. POWER ON/OFF SWITCH
This switch turns the transceiver power on and off.

2. HEAD PHONE JACK
Connect head phone plug, Impedance > 32 Ohms, Mono

3. MICROPHONE INPUT
6 pin socket for Albrecht Standard Electret Hand Microphone

4. VOLUME CONTROL
Controls audio output level

5. SQUELCH CONTROL
Used to quiet the receiver during absence of receive signals
Sensitivity to incoming signals is fully adjustable

6. POWER CONTROL Fine adjusting of the Transmit Output Power, down to 3 W FM/SSB or 0.5 Watt AM

7. CLARIFIER CONTROL
This control provides an adjustment for turning in stations which are slightly OFF frequency, to optimise the AM and SSB reception and transmission.

8. RF GAIN & MIC GAIN CONTROL
Control the receiver sensitivity by RF GAIN CONTROL (outer knob) to reduce interference. To decrease RF gain, turn the knob counter clockwise. For the maximum receiver sensitivity, the RF GAIN control must be rotated clockwise.
MIC GAIN CONTROL (inner knob)
This control provides the proper or desired modulation.

9. CHANNEL SELECTOR SWITCH
This Rotary switch selects the frequency steps. (Switch not active during transmission)

10. SWR CALIBRATION CONTROL
The calibration control provides (while keying transmitter) meter calibration adjustment enabling true standing wave ratio reference.

11. CAL/ SWR/ MOD SELECTION
This switch is used to select the scale to be read on the SWR/ Power Meter. The switch has three positions MOD (Modulation), CAL (Calibrate), SWR (Standing Wave Ratio)

KEYBOARD switches 12 - 19

Some of these switches have a double or even 3 way functions. Pressing the **FUNCTION** knob (17) before lets You select the second function of the key. In some cases the third function is selected automatically depending on Your logical actions before.

Primary function is indicated by "FUNCTION OFF:" This means no FUNC button shall be pressed

Second function is indicated with " FUNCTION ON: " This means that You must press the FUNC button shortly before using the desired button.

- **Third function** is always indicated in this way

12. MODE / LOW / MEMORY 5 SWITCH
Double function button: without pressing FUNCTION before:
MODE FUNCTION – select one of the operation modes
FM / AM / USB / LSB

- Load channel in the memory 5 with MEM switch.

After pressing FUNCTION button before:
LOW FUNCTON – This switch activates tone low (high cut) circuits.

- Save channel in the 5 with MEM switch.

13. MEMORY SWITCH

FUNCTION OFF:
MEMORY LOAD FUNCTION – Load one of the 5 memory channels with 5 numeric key.

FUNCTION ON:
MEMORY SAVE FUNCTION – Save one of the 5 memory channels with 5 numeric key.

14. LCR / MEMORY 4 SWITCH

FUNCTION OFF:

LCR (Last Channel Recall) FUNCTION – Press LCR to return to the last channel that was used for longer than 3 seconds or was transmitted on.

- Load channel in the memory 4 with MEM switch

FUNCTION ON;

- Save channel in the memory 4 with MEM switch

15. CALL / MEMORY 2 SWITCH

FUNCTION OFF:

CALL FUNCTION – This switch is used to access a reprogrammed frequency (memory 2)

- Load channel in the memory 2 with MEM switch

FUNCTION ON:

- Save channel in the memory 2 with MEM switch

16. DIM SWITCH

FUNCTION OFF:

DIM FUNCTION – This switch is used to switch the instruments and keyboard illumination from bright to dimmer.

17. FUNC SWITCH

BRIEF PUSH: This switch activates as **FUNCTION** switch the secondary function of double function switches.

18. STEP / NB / MEMORY 1 SWITCH

FUNCTION OFF:

STEP FUNCTION – This switch is used for select one of the frequency steps between: 1KHz / 10KHz / 100KHz

1KHz: **Sets 1KHz digit of the desired operating frequency.**
10KHz: **Sets 10 KHz digit of the desired operating frequency.**
100 KHz: **Sets 100KHz digit of the desired operating frequency**.

- Load channel in the memory 1 with MEM switch.

FUNCTION ON:

NB FUNCTION – (**N**oise **B**lanker) If your reception is disturbed by interference from impulse type noise (ignition noise and other electrical noise press NB to reduce or eliminate the noise)

- Save channel in the memory 1 with MEM switch.

19. SCAN / SHIFT / MEMORY 3 SWITCH
FUNCTION OFF:
SCAN FUNCTION – Set the scan mode on/off in RX mode.

- Load channel in the memory 3 with MEM switch.

FUNCTION ON:
SHIFT FUNCTION for Repeater operation – Press the shift switch to select the direction: + SHIFT / -SHIFT. Press more than 3 seconds the SHIFT switch to select to off-set step: 0 ~ 990KHz. In most countries 100 kHz shift is usual. You can get more information by the local amateur radio clubs.

- Save channel in the memory 3 with MEM switch.

20. LCD DISPLAY
LCD indicates the frequency or channels if selected.

21. MOD / SWR ANALOG METER
This meter reflects SWR calibration and modulation, operated in TX mode.

22. S / RF ANALOG METER
In receive mode, this meter displays incoming signal strength. In the transmit mode this Meter displays RF power.

BEEP/TONE
Turning on power switch while keeping PTT key pressed sets beep mode on/off.

Display Panel Features: Illustrated below are all the VISUAL INDICATORS that appear on the display, and the corresponding feature function that they associate with.

Liquid Crystal Display Panel: The liquid crystal panel provides the user with a visual information on the operation and status of the AE 497 W.

CAUTION: Due to the physical behaviour of LCD's, liquid crystal displays should not be subjected to extremes of temperature or humidity. If the unit is exposed to temperatures below -20°C (-5°F) or above + 60°C (+140°F), the display may temporarily cease to function properly, and in some cases, could result in permanent

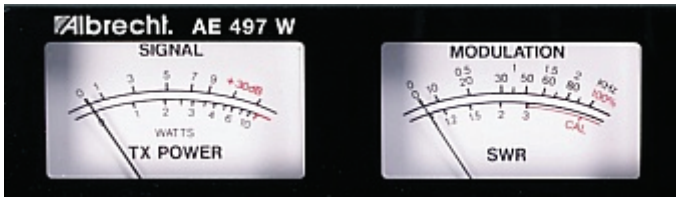
damage. Do not subject radio to extreme conditions, such as closed automobile in direct sunlight or continuous sub zero temperatures.

All liquid crystal displays have a preferred viewing angle when the display contrast is at a maximum. The best viewing point will vary by user, depending on such variables as temperature, humidity, battery condition, and the actual users eyesight.

- **Function** (FUNC) Mode: Indicates that the “FUNC” button has been selected, which allows for operation of many of the various features.
- **AM**: Indicates AM mode operation.
- **FM**: Indicates FM mode operation.
- **USB**: Indicates Upper Sideband mode operation.
- **LSB**: Indicates Lower Sideband mode operation.
- **SCAN**: Indicates that the radio is in the “scan” mode which works in conjunction with all frequency and five memory locations.
- **Frequency Readout**: Displays the corresponding frequency associated with the channel you are communicating with.
- **LOW**: Indicates that the Tone Low feature has been turned on.
- **SHIFT**: Indicates that the SHIFT (+ and -).
- **NB**: Indicates that the Noise Blanker features has been turned on.
- “**L**”: Indicates that the memory recall (= **L**oad) mode has been activated
- “**S**”: Indicates that the radio is in the “**Memory Store**” mode, ready to receive a channel into one of the memory locations.
- **TX**: Indicates that the radio is in the “transmit” mode.

ANALOG INDICATOR METER:

A **B**



A **S-TX METER**: Indicates relative incoming signal strength and RF out put power.

B **Modulation / SWR Meter:** Measures the percent modulation of the AM signal. Note that the CAL/SWR/MOD switch must be in the “MOD” position for the meter to measure and read modulation.

SWR METER: Measures the ratios of standing wave ratio of the antenna system, which is critical in properly adjusting the length antenna and all related electrical connections. This meter will indicate if there are any major changes in these critical areas caused by such things as humidity, vibration, or corrosion, which will cause the SWR Meter to rise. A rising SWR indicates that a problem exists.

To Calibrate SWR:

a) Set the radio into the AM mode.

b) Switch the CAL/SWR/MOD knob to the SWR position

c) Transmit by pressing the PTT button on the microphone, and adjust the SWR/CAL, control until the needle reaches the CAL position on the meter.

d) Put the CAL/SWR/MOD knob back to the SWR position, and read the SWR value.

INSTALLATION

LOCATION OF THE RADIO

Prior to beginning operation if the transceiver, a basic installation must be prepared. Installation of the transceiver itself is a rather simple procedure. In selecting the location for the unit, two basic factors must be considered:

A. Access to 230V, 50Hz or 13,8V DC power source.

B. The location must be convenient for running the antenna lead in cable if an outside antenna installation is proposed.

BASE STATION ANTENNA

Since the maximum allowable power output of the transmitter may be limited by the Regulations or Licence classes, the antenna is the most important factor affecting transmission distance. Only a properly matched antenna will allow maximum power transfer from the 50 ohm transmission line to the radiating element.
The recommended method of antenna turning is to use the built in SWR meter to adjust the antenna turning for maximum reflected power. The radio may be used with any type of 50 ohm base station antenna.

A ground plane vertical antenna will provide the most uniform horizontal coverage. This type of antenna is best suited for communication with a mobile unit. For point to point operation where both stations are fixed, a directional beam will usually increase communicating range since this beam antenna also allows the receiver to “listen” in only one direction, thus reducing interfering signals.

OPERATING PROCEDURES TO RECEIVE

1. Turn the radio ON by pressing the **POWER** switch.

2. Press the "**Mode**" selection button (labeled "5" on the button) continuously until you find the mode of operation you desire to operate in (AM, FM, USB, LSB).

3. Adjust the **VOLUME** control until you reach your desired listening level.

4. Turn the frequency selector knob to the desired operating frequency.

5. Turn the **RF** GAIN control completely clockwise.

6. Adjust the "**CLARIFIER**" control to clarify the SSB signals (start from middle position).

7. Listen to the background noise coming from the radio. Turn the squelch control slowly until the noise just disappears. (No signal should now be present). Leave the control at this setting. The SQUELCH is now properly adjusted. The receiver will remain quiet until a signal is actually received. Do not advance the knob too far, as some of the weaker signals will not be heard.

OPERATING PRODEDURE TO TRANSMIT

1. Select the desired frequency of transmission.

2. Set the MIC GAIN control fully clockwise.

3. Activate the press to talk switch. The receiver and transmitter are controlled by the press to talk switch on the microphone. Press the switch and the transmitter is activated. Release the switch to receiver.

4. Hold the microphone two inches from your mouth, speak in a clear normal voice.

5. The S-TX meter will indicate power output and the modulation meter will indicate percentage of modulation as you speak into the microphone.

CAUTION: Be sure the antenna is properly connected to the radio before transmitting. Transmitting without an antenna or a poorly matched antenna could cause damage to the transmitter.

RESEIVING SSB SIGNALS

There are four types of signals presently used for communications in the Citizen Band: AM, FM, USB and LSB. When the MODE switch on your unit is placed in the AM position, only standard double sideband, fully carrier signals will be detected. An SSB signal may be recognized while in the AM mode to produce an intelligible output. The USB and LSB modes will detect upper sideband an lower sideband respectively, and standard AM signals.

SSB reception differ from standard AM reception in that SSB receiver does not require a carrier or opposite sideband to produce an intelligible signal. A single sideband transmitted signal consists only of the upper or the lower sideband and no carrier is transmitter. The eliminate of the carrier from the AM signal helps to eliminate the biggest cause of whistles and tones heard on channels which make even moderately strong AM signals unreadable. Also, SSB take only half of an AM mode therefore two SSB conversations will fit into each frequency, expanding the two time frequency. The reduction in channel space required also helps in the receiver because only half of the noise and interference can be received with 100% of the SSB signal.

An SSB signal may be received only when the listening receiver is functioning in the same mode. In other words, an Upper Sideband Signal (USB) may be made intelligible only if the receiver is functioning in the USB position.

If a Lower Sideband (LSB) signal is heard when the receiver is in the USB mode, no amount of turning will make the signal intelligible. The reason for this may be understood if you consider that when the modulation is applied to the transmitter`s microphone in the USB mode, the transmitter`s output frequency is increased whereas in the LSB mode the transmitter's output frequency is decreased. The result in listening to the receiver is that when the MODE switch is in the proper position (either USB or LSB), a true reproduction of single tone of modulation will result, and if the tone is increased in frequency (such as a low pitched whistle or a high pitched whistle) you will hear the increase in the output tone of the receiver. If the incorrect mode is selected, an increase in tone of a whistle applied to the transmitter will cause a decrease in the resultant tone from the receiver.

Thus when a voice is used in place of a whistle or a tone, in the proper listening mode the voice will be translated backwards and cannot be made intelligible by the voice lock control. When listening to an AM transmission, a correct side band is heard in either mode since both upper and lower sideband are received. Once the desired SSB mode has been selected, frequency adjustment may be necessary in order to make the incoming signal intelligible. The CLARIFIER controls allow the operator to vary the frequency above and below the exact center frequency of the received signal. If the sound of the incoming signal is too high or too low pitched, adjust the CLARIFIER control. Consider it as performing the same function as a Dictaphone speed control. When the speed is set too high, voices will be high pitched, and if set too low, voices will be low pitched. Also, there is only one correct speed that will make a particular tape produce the same sound that was recorded. If the tape is played on a player that rotates in the wrong direction (opposite sideband), no amount of speed control (Clarifier) will produce an intelligible sound.

An AM signal received while listening in one of the SSB modes will produce a steady tone (carrier) in addition to the intelligence, unless the SSB receiver is turned to exactly the same frequency by the Clarifier control. For simplicity it is recommended the AM modes be used to listen to AM signals.

Connectors for accessories
Mic socket (3)

6 pin Standard plug, for Albrecht standard electret microphones with appr. 600 Ohm to1 kOhm Impedance:

PIN 1	Mic Audio
PIN 2	PTT-RX contact and Packet-Radio audio output
PIN 3	PTT-TX contact
PIN 4	UP- / DOWN keys
PIN 5	Common ground, shielding
PIN 6	+ supply voltage for mic preamplifiers

Warning Notes: We have modified the mic wiring by end of 2008 to our Albrecht Standard hand microphone with up/down key wiring. Please **never** connect any older microphone type with additional switches as they had been in use for former versions of this model (AE 497 S or AE 497WS or older versions of AE 485 S). The former additional key wiring may damage the PIN 6 power supply wiring inside the new radio model.

Extension speaker socket (rear side)
3.5 mm Mono- socket for 4- 8 Ohm speakers with at least 2-4 Watt.

Earphone socket (2)
On the front panel You can find the PHONES socket. This is designed for MONO phones with 6.3 mm mono plug and standard impedances of 32 Ohms or higher. Stereo headphones can only be connected via adapter Stereo-to-Mono or must be equipped with a Mono 6.3 mm phones plug. It is not allowed to connect low impedance headphones (with 8 Ohms or less), because EU regulations do not allow any more to use headphones and outputs where a risk of acoustical shocks may exists.

Programming Modes
For skilled service people we have provided a sub PCB inside of the radio which allows programming of several special channel configuration modes. Modifications are only allowed for use in countries where different modes are allowed. While it is allowed to sell amateur radios with the extended channel system + standard 10 m VFO mode in Germany (jumper position 2), some other European countries do not allow this and accept only the 10 m VFO range. In such cases the jumper must be plugged from position 2 into the position 1 by your distributor before sales. The reset button must be pressed after reprogramming.

Repair & Service
If any resending for repairs or warranty matters may become necessary for radios sold in Germany, please contact our hotline by phone. The Hotline will inform you about the nearest service address.
Customers outside Germany should contact their local distributor.

Software procedure for Channel Mode (if enabled) :

- **Press FUNC and after this press „2/Call“** for longer than 3 seconds
- The radio works then in a channelized mode from 25.165 MHz to 29.695 MHz on 454 channels in 10 bands.
- Band switch: Press **2/Call**

Toggle between **channel number** and **frequency display**:

- Press FUNC and then **2/CALL shortly**.

Frequency Range	**Function**
28.000-29.699 MHz Frequenzmode	In some countries requested
28.000-29.699 MHz Frequency Mode **+** 26.165- 29.695 MHz channel mode (454 channels)	Enabled for sales in Germany. Switching via Function + 2/CALL (press 3 seconds)

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Technical Hotline: 01805 012204 (only for radios sold in Germany, 14 cents/minute, other charges from mobile networks)
Customers in other countries please contact the local distributor or point of sale.

Spare parts service: 06103-9481-22
Fax : 06103-9481-60
e-mail : service@alan-electronics.de
Download-Server: www.hobbyradio.de

ALBRECHT®

Declaration of Conformity

We hereby declare that our product: **10 m Amateur Radio Transceiver**

AE 497 W

satisfies all technical regulations applicable to the product within the scope of EU Council Directives and harmonized European Standards:

EU- Directives : 73/23/EEC, 2004/108/EG and 99/5 EC ;
European Standards EN 301 489-1 V 1.8.1, EN 301 489-15 V 1.2.1, EN 301 783-2 V.1.1.1, EN 60 950- 1 : 2006
All essential radio test suites have been carried out.

Alan Electronics GmbH
Daimlerstr. 1 k
63303 Dreieich
GERMANY

This declaration is issued under the sole responsibility of the manufacturer according to the procedure of Annex III R&TTE directive.

Basing on this declaration, the amateur radio may be used only by authorized persons having a valid amateur radio licence, and only for the purpose of amateur radio service in the dedicated frequency ranges.

Note: the latest valid issue of this Declaration of Conformity, as well as all other information about this radio and possible restrictions of use, can be downloaded any time from our public internet server under:

http://www.hobbyradio.de

Contact person: Wolfgang Schnorrenberg

Place and date of issue:

Lütjensee, den 22. 12. 2009

(Signature)
Dipl.-Phys. Wolfgang Schnorrenberg
Alan Electronics GmbH

Frequency table for AE 497W (only for activated channel-mode)

Channel number	A	B	C	D	E	F	G	H	I	J
1	25.165	25.615	26.065	26.515	26.965	27.415	27.865	28.315	28.765	29.215
2		25.625	26.075	26.525	26.975	27.425	27.875	28.325	28.775	29.225
3	25.185	25.635	26.085	26.535	26.985	27.435	27.885	28.335	28.785	29.235
3A	25.195	25.645	26.095	26.545	26.995	27.445	27.895	28.345	28.795	29.245
4	25.205	25.655	26.105	26.555	27.005	27.455	27.905	28.355	28.805	29.255
5	25.215	25.665	26.115	26.565	27.015	27.465	27.915	28.365	28.815	29.265
6	25. 225	25.675	26.125	26.575	27.025	27.475	27.925	28.375	28.825	29.275
7	25. 235	25.685	26.135	26.585	27.035	27.485	27.935	28.385	28.835	29.285
7A	25.245	25.695	26.145	26.595	27.045	27.495	27.945	28.395	28.845	29.295
8	25. 255	25.705	26.155	26.605	27.055	27.505	27.955	28.405	28.855	29.305
9	25. 265	25.715	26.165	26.615	27.065	27.515	27.965	28.415	28.865	29.315
10	25.275	25.725	26.175	26.625	27.075	27.525	27.975	28.425	28.875	29.325
11	25.285	25.735	26.185	26.635	27.085	27.535	27.985	28.435	28.885	29.335
11A	25.295	25.745	26.195	26.645	27.095	27.545	27.995	28.445	28.895	29.345
12	25.305	25.755	26.205	26.655	27.105	27.555	28.005	28.455	28.905	29.355
13	25.315	25.765	26.215	26.665	27.115	27.565	28.015	28.465	28.915	29.365
14	25.325	25.775	26.225	26.675	27.125	27.575	28.025	28.475	28.925	29.375
15	25.335	25.785	26.235	26.685	27.135	27.585	28.035	28.485	28.935	29.385
15A	25.345	25.795	26.245	26.695	27.145	27.595	28.045	28.495	28.945	29.395
16	25.355	25.805	26.255	26.705	27.155	27.605	28.055	28.505	28.955	29.405
17	25.365	25.815	26.265	26.715	27.165	27.615	28.065	28.515	28.965	29.415
18	25.375	25.825	26.275	26.725	27.175	27.625	28.075	28.525	28.975	29.425
19	25.385	25.835	26.285	26.735	27.185	27.635	28.085	28.535	28.985	29.435
19A	25.395	25.845	26.295	26.745	27.195	27.645	28.095	28.545	28.995	29.445
20	25.405	25.855	26.305	26.755	27.205	27.655	28.105	28.555	29.005	29.455
21	25.415	25.865	26.315	26.765	27.215	27.665	28.115	28.565	29.015	29.465
22	25.425	25.875	26.325	26.775	27.225	27.675	28.125	28.575	29.025	29.475
23	25.455	25.905	26.355	26.805	27.255	27.705	28.155	28.605	29.055	29.505
24	25.435	25.885	26.335	26.785	27.235	27.685	28.135	28.585	29.035	29.485
25	25.445	25.895	26.345	26.795	27.245	27.695	28.145	28.595	29.045	29.495
26	25.465	25.915	26.365	26.815	27.265	27.715	28.165	28.615	29.065	29.515
27	25.475	25.925	26.375	26.825	27.275	27.725	28.175	28.625	29.075	29.525
28	25.485	25.935	26.385	26.835	27.285	27.735	28.185	28.635	29.085	29.535
29	25.495	25.945	26.395	26.845	27.295	27.745	28.195	28.645	29.095	29.545
30	25.505	25.955	26.405	26.855	27.305	27.755	28.205	28.655	29.105	29.555
31	25.515	25.965	26.415	26.865	27.315	27.765	28.215	28.665	29.115	29.565
32	25.525	25.975	26.425	26.875	27.325	27.775	28.225	28.675	29.125	29.575
33	25.535	25.985	26.435	26.885	27.335	27.785	28.235	28.685	29.135	29.585
34	25.545	25.995	26.445	26.895	27.345	27.795	28.245	28.695	29.145	29.595
35	25.555	26.005	26.455	26.905	27.355	27.805	28.255	28.705	29.155	29.605
36	25.565	26.015	26.465	26.915	27.365	27.815	28.265	28.715	29.165	29.615
37	25.575	26.025	26.475	26.925	27.375	27.825	28.275	28.725	29.175	29.625
38	25.585	26.035	26.485	26.935	27.385	27.835	28.285	28.735	29.185	29.635
39	25.595	26.045	26.495	26.945	27.395	27.845	28.295	28.745	29.195	29.645
40	25.605	26.055	26.505	26.955	27.405	27.855	28.305	28.755	29.205	29.655
41										29.665
42										29.675
43										29.685
44										29.695